

IN THE CLAIMS:

1.-4. (Cancelled)

5. (Currently Amended) An ion measuring composite electrode comprising:
an outer pipe having a closed distal end with a diameter of a portion adjacent the
distal end narrower than a proximal end thereof;
an ion responsive section and a liquid connecting section is provided on the outer
5 pipe; and

an inner pipe is provided within the outer pipe and is spaced from the outer pipe
by [[an]] a string-like elongated member with liquid absorption characteristics to form an annular
space for providing a space for a reference liquid[[;]] , the inner pipe is connected to the outer
pipe to form the annular space and the string-like member is spirally wound around the inner
10 pipe.

6. (Original) The ion measuring composite electrode of Claim 5 wherein the
elongated member is a string wound around the inner pipe.

7. (Original) The ion measuring composite electrode of Claim 6 wherein the outer
pipe and inner pipe are glass that are connected together by welding.

8. (Original) The ion measuring composite electrode of Claim 6 wherein a cotton
string is wound spirally around the inner pipe.

9. (Currently Amended) In an improved measuring instrument for measuring a
liquid specimen, the improvement comprising:

a composite electrode including an inner pipe spaced by an elongated a string-like member wrapped around the inner pipe for offsetting a surrounding hollow outer pipe, the inner 5 pipe is welded to the outer pipe to provide an annular space between the inner and outer pipe for receiving a reference electrode liquid, the string-like member has liquid absorption characteristics.

10. (Original) The improved measuring instrument of Claim 9 wherein the elongated member is a string having hydrophilicity for a reference electrode liquid.

11. (Original) The improved measuring instrument of Claim 10 wherein the elongated member is compressed between the inner pipe and the outer pipe to concentrically aligned respective axes of the inner pipe and outer pipe.

12. (Currently Amended) An ion measuring composite electrode comprising:
an inner hollow glass pipe;
an outer hollow glass pipe having an inner surface cross sectional dimension greater than an outer surface cross sectional dimension of the inner hollow glass pipe, wherein 5 the inner hollow glass pipe is positioned within the outer hollow glass pipe;
a flexible material string-like member, having a characteristic of liquid absorption, is positioned between the inner surface of the outer hollow glass pipe and the outer surface of the inner hollow glass pipe to space the inner hollow glass pipe from the outer hollow glass pipe, wherein the inner hollow glass pipe outer diameter is sealed to the inner diameter of 10 the outer hollow glass pipe to form a reference electrode internal liquid space and the string-like member is spirally wound around the inner hollow glass pipe;

a liquid connecting section is provided adjacent one end of the outer hollow glass pipe to communicate with the sealed reference electrode internal space between the inner hollow glass pipe and the outer hollow glass pipe;

15 a reference electrode internal liquid is in the sealed reference electrode internal spacer;

a reference electrode communicates with the sealed reference electrode internal spacer;

a measuring electrode internal liquid is within the hollow inner glass pipe;

20 an internal electrode communicates with the inner hollow glass pipe; and
an ion responsive section is provided on the outer hollow glass pipe.

13. (Currently Amended) The ion measuring composite electrode of Claim 12
wherein the flexible string-like material is a water absorption material.

14. (Currently Amended) The ion measuring composite electrode of Claim 13
wherein the flexible string-like material is an elongated material wound around the inner hollow glass pipe.

15. (Currently Amended) The ion measuring component electrode of Claim 14
wherein the flexible string-like material is helically wound between the inner glass pipe and the
outer hollow glass pipe.

16. (Currently Amended) The ion measuring composite electrode of Claim 15
wherein the flexible string-like material is adhered adjacent one end of the inner hollow glass
pipe.

17. (Previously Presented) The ion measuring composite electrode of Claim 16 wherein the inner hollow glass pipe is annularly welded at one end to the outer hollow glass pipe.

18. (Previously Presented) The ion measuring composite electrode of Claim 12 wherein the outer hollow glass pipe has an enlarged inner diameter at one end and the inner glass pipe has an enlarged outer diameter positioned within the enlarged inner diameter.

19. (Previously Presented) The ion measuring composite electrode of Claim 18 further including a first assembly cap attached to the outer hollow glass pipe and a second assembly cap mounted within the first assembly cap and attached to the inner hollow glass pipe.

20. (Currently Amended) The ion measuring composite electrode of Claim 12 wherein the flexible string-like material is selected from one of sponge, rubber and an elongated cotton string.

21. (Previously Presented) The ion measuring composite electrode of Claim 20 wherein the cotton string is wound around an outer peripheral surface of the inner hollow glass pipe to both space the outer hollow glass pipe from the inner hollow glass pipe and to provide electrical conductivity in the presence of any bubble in the reference electrode internal liquid.

22. (Currently Amended) An ion measuring composite electrode comprising:
an inner hollow glass pipe;
an outer hollow glass pipe having an inner surface cross sectional dimension greater than an outer surface cross sectional dimension of the inner hollow glass pipe, wherein
5 the inner hollow glass pipe is positioned within the outer hollow glass pipe;

a water absorbing flexible material string-like member is positioned between the inner surface of the outer hollow glass pipe and the outer surface of the inner hollow glass pipe to space the inner hollow glass pipe from the outer hollow glass pipe, wherein the inner hollow glass pipe outer diameter is sealed to the inner diameter of the outer hollow glass pipe to form a
10 reference electrode internal liquid space and the string-like member is spirally wound around the inner hollow glass pipe;

a liquid connecting section is provided adjacent one end of the outer hollow glass pipe to communicate with the sealed reference electrode internal space between the inner hollow glass pipe and the outer hollow glass pipe;

15 a reference electrode internal liquid is in the sealed reference electrode internal spacer;

a reference electrode communicates with the sealed reference electrode internal spacer;

a measuring electrode internal liquid is within the hollow inner glass pipe;

20 an internal electrode communicates with the inner hollow glass pipe; and

an ion responsive section is provided on the outer hollow glass pipe, wherein the outer hollow glass pipe has an enlarged inner diameter at one end and the inner hollow glass pipe has an enlarged outer diameter positioned with the enlarged inner diameter when compared to the inner and outer diameter adjacent the ion responsive section.

23. (New) The ion measuring composite electrode of Claim 22 wherein the string-like member is a cotton string.

24. (New) The ion measuring composite electrode of Claim 23 wherein the cotton string is adhered with an adhesive material to the outer surface of the inner hollow glass pipe adjacent a liquid connecting section on the outer hollow glass pipe and the cotton string is spirally wound around the inner hollow glass pipe and compressed against the inner surface of the outer hollow glass pipe, wherein the cotton string stops being spirally wound around the inner hollow glass pipe adjacent the reference electrode.

25. (New) In an improved measuring instrument for measuring a liquid specimen, a reference electrode internal liquid, the improvement comprising:

a composite electrode including an inner glass pipe and an outer glass pipe, the inner glass pipe is integrally connected adjacent one end of the outer glass pipe and cantilevered towards another end of the outer glass pipe from the integral connection to contain the reference electrode internal liquid between an outer surface of inner glass pipe and an inner surface of the outer glass pipe; and

means for preventing a disconnect in electrical conduction of the reference electrode internal liquid by any formation of bubbles in the reference electrode internal liquid between the surface of the inner glass pipe and the surface of the outer glass pipe including an elongated member with hydrophilicity for the reference electrode internal liquid extending between and intermittently contacting the outer surface of the inner glass pipe and the inner surface of the outer glass pipe.

26. (New) The improved measuring instrument of Claim 25 wherein the elongated member is a string-like member.

27. (New) The improved measuring instrument of Claim 26 wherein the elongated member is a string helically wound around the outer surface of the inner glass pipe and sandwiched against the inner surface of the outer glass pipe.

28. (New) An ion measuring composite electrode comprising:

- an inner hollow glass pipe;
- an outer hollow glass pipe having an inner surface cross sectional dimension greater than an outer surface cross sectional dimension of the inner hollow glass pipe, wherein
- 5 the inner hollow glass pipe is positioned within the outer hollow glass pipe and integrally interconnected at one end of the inner hollow glass pipe to be cantilevered co-axially within the outer hollow glass pipe to form an annular internal spacer for a reference electrode internal liquid between the inner surface of the outer hollow glass pipe and the outer surface of the inner hollow glass pipe;
- 10 a liquid connecting section is provided adjacent one end of the outer hollow glass pipe to communicate with the sealed reference electrode internal space between the inner hollow glass pipe and the outer hollow glass pipe and a sample specimen exterior to the outer glass pipe;
- a reference electrode internal liquid is in the sealed reference electrode internal spacer;
- 15 a reference electrode communicates with the sealed reference electrode internal spacer;
- a measuring electrode internal liquid is within the hollow inner glass pipe;
- an internal electrode communicates with the inner hollow glass pipe;
- an ion responsive section is provided on the outer hollow glass pipe; and

20 a flexible reference electrode internal liquid absorbing material is positioned between the inner surface of the outer hollow glass pipe and the outer surface of the inner hollow glass pipe to space the inner hollow glass pipe from the outer hollow glass pipe, and to provide a linear conductive path from the liquid connecting section through the annular internal space with the reference electrode internal liquid and to provide a flexible support between the outer hollow
25 glass pipe and the inner hollow glass pipe.

29. (New) The ion measuring composite electrode of Claim 28 wherein the flexible material is an elongated material wound around the inner hollow glass pipe.

30. (New) The ion measuring component electrode of Claim 29 wherein the flexible material is helically wound between the inner glass pipe and the outer hollow glass pipe.

31. (New) The ion measuring composite electrode of Claim 28 wherein the flexible material is adhered adjacent one end of the inner hollow glass pipe adjacent the liquid connecting section.

32. (New) The ion measuring composite electrode of Claim 28 wherein the outer hollow glass pipe has an enlarged inner diameter at one end and the inner glass pipe has an enlarged outer diameter positioned within the enlarged inner diameter.

33. (New) The ion measuring composite electrode of Claim 32 further including a first assembly cap attached to the outer hollow glass pipe and a second assembly cap mounted within the first assembly cap and attached to the inner hollow glass pipe.

34. (New) The ion measuring composite electrode of Claim 28 wherein the flexible material is an elongated cotton string.

35. (New) The ion measuring composite electrode of Claim 34 wherein the cotton string is wound around an outer peripheral surface of the inner hollow glass pipe to both space the outer hollow glass pipe from the inner hollow glass pipe and to provide electrical conductivity in the presence of any bubble in the reference electrode internal liquid.